Fischer's Turaco *Tauraco fischeri* in Zanzibar: a survey re-assessing its conservation status

Kariuki Ndang'ang'a[a], *Luca Borghesio*[b], *Mohammed Ayoub Haji*[c], *Aliy Abdurahim Aliy*[d],
Marcy Edwards[e], *Danica Demilio*[f], *Andrea Borghesio*[b] *and Roberto Gavioso*[g]

Le Touraco de Fischer *Tauraco fischeri* à Zanzibar: un inventaire évaluant son statut de conservation. Nous avons recensé les Touracos de Fischer (race endémique *Tauraco fischeri zanzibaricus*) à l'île de Zanzibar (Tanzanie) pendant un mois. Nous avons essayé de déterminer les préférences écologiques, la distribution et la taille de la population. Contrairement à ce qui a été trouvé précédemment, le touraco, dont la population compte 900–1.500 individus, est bien répandu, occupant environ 56 km″ de forêt. Il évite les zones agricoles et les plantations, préférant les zones forestières avec une couverture dense et une haute canopée. La plus grande partie de cette forêt n'est pas protégée et est très menacée par une exploitation abusive, principalement pour la coupe de bois de chauffe. Ce même milieu est habité par deux mammifères menacés, le Colobe de Zanzibar *Procolobus kirkii* et le Rat à trompe de Zanj *Rhynchocyon petersi*. La distribution du touraco est déjà sévèrement fragmentée et sa population est sans doute en diminution. Nous proposons que *Tauraco fischeri* soit considéré comme 'Vulnérable' selon les critères de l'UICN.

Fischer's Turaco *Tauraco fischeri* is currently considered Near Threatened[2], being restricted to the coast of southern Somalia, Kenya and north-east Tanzania. The subspecies *T. f. zanzibaricus* is endemic to Zanzibar Island. Following its description in the 1930s[11], *T. f. zanzibaricus* has been observed on comparatively few subsequent occasions, and was even suspected of being extinct[3]. Few observations from Zanzibar have been published[12,15], all from the tiny area around Jozani Forest, a small reserve in the south of the island. Based on existing data, this subspecies has been considered to number just 25–50 birds[2] or fewer than 50 pairs[15].

Detailed information on the biology of Fischer's Turaco in Zanzibar, and elsewhere, is lacking, making it difficult to evaluate its conservation status. Between 22 June and 21 July 2001, we surveyed the species in Zanzibar. We assessed habitat selection and evaluated the present and likely future conservation status of the species. We also assessed the status of natural habitats in Zanzibar, using Fischer's Turaco as an indicator of the general condition of local ecosystems.

Study site

Zanzibar Island (also known as Unguja) is located in the southern Indian Ocean, at c05□40'S 39□50'E, 40 km off the coast of Tanzania. The island covers c1,666 km^2 and can be divided into two zones, characterised by different soil types[6]. The deep soil zone in the west of the island mainly supports permanent cultivation, while the coral rag zone, with a very shallow soil, can only support shifting cultivation and has a lower human population density. Since it was apparent that conditions in the densely inhabited deep soil zone were unfavourable for turacos, our survey was entirely restricted to the coral rag zone, which occupies c60% of the total island area.

The conservation importance of Zanzibar is undoubtedly high, as the main natural habitat in the island, East African coastal forest, is biologically very rich and is considered highly threatened[5,14]. Indeed, the island has several endemic or sub-endemic mammals[10], butterflies and reptiles[4]. However, overall the biota of Zanzibar have received very little scientific attention in the past.

Methods

We censused Fischer's Turaco using unlimited-distance point counts, performing playbacks of the species' call at evenly spaced points throughout the coral rag zone of the island. At each census point we also recorded the presence of four other species: Indian House Crow *Corvus splendens*, an introduced avian pest; two endangered mammals[8], Zanzibar Red Colobus *Procolobus kirkii* and Black-and-rufous

Elephant-shrew *Rhynchocyon petersi*, and the common and widespread Sykes's Monkey *Cercopithecus mitis*.

We assessed habitat characteristics by recording 13 different variables in a sample of 181 bird census points. A comparison of habitat with turaco presence/absence data from these points provided data on habitat selection. To map current and past forest cover in the Zanzibar coral rag zone we compared three datasets: (1) habitat features indicated on maps drawn from aerial photos of 1977–78[7], (2) data on vegetation composition and structure collected by Beentje in 1989[1], and (3) present vegetation data collected from census points during our visit. This information resulted in an updated map of vegetation cover. The current range of Fischer's Turaco was estimated by plotting all detection points from the survey on the new map.

Mean number of cut stems in the census plots was used as an indication of the intensity of human activity in different parts of the study area, enabling classification of different areas into one of three human-impact categories: low (0–5 stems per 10 m radius plot), medium (5.01–20) and strong (>20) impact.

Results and discussion

Vegetation

We recognised three main habitat categories within the study area:

1. Four man-modified habitats, viz. cultivated fields, open grassland, tree plantations and settled areas.
2. *Albizia*-dominated vegetation, which usually occurs on the coast and is characterised by *A. glaberrima*, *A. adianthifolia* and *A. gummifera* trees. Also lumped with this habitat was the c200 ha of groundwater forest within Jozani Forest Reserve that is dominated by *Pandanus rabaiensis* and *Elaeis guineensis* (Fig 1).
3. *Diospyros*-dominated vegetation, the most common vegetation type in the study area and characterised by the common presence of *D. consolatae*. Other common tree species are *Rapanea melanophloeos*, *Mystroxylon aethiopicum*, *Olea woodiana*, *Euclea schimperi* and *E. racemosa*. This vegetation mostly occurs in drier areas than the *Albizia*-dominated vegetation.

Habitat of Fischer's Turaco in Zanzibar

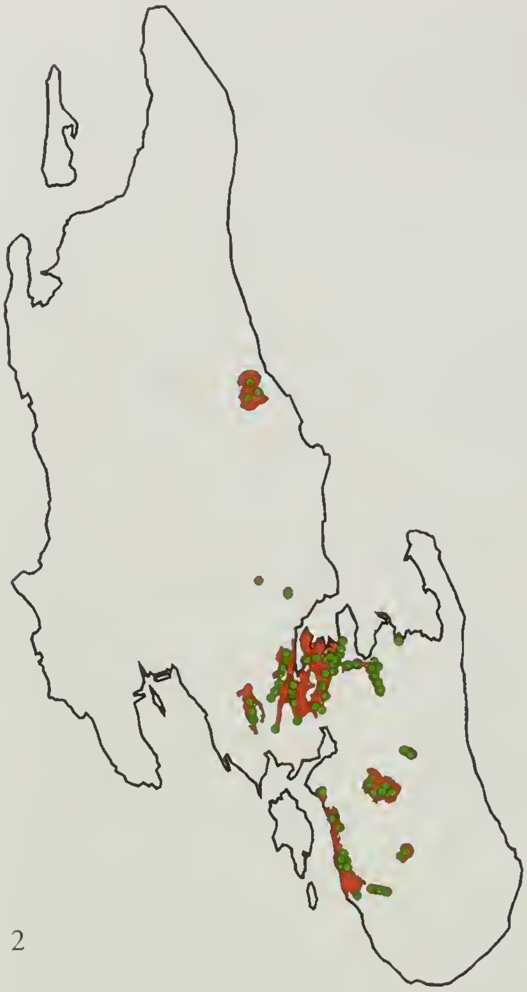
Fischer's Turaco was detected at 76 of the 325 census points sampled. It selected only two habitat types (*Albizia*- and *Diospyros*-dominated). Places where it was found had greater tree cover, a higher density of tree stems, and higher and more closed canopies than those where it was not seen. The species was quite sensitive to habitat degradation and strongly avoided man-modified habitats. Fruit availability did not differ between occupied and unoccupied sites, suggesting that the species' distribution in Zanzibar is defined by habitat, but is not food-limited.

Evidence from our survey suggests that *Albizia* is the primary habitat of Fischer's Turaco, as the species was found at higher density in such areas, and tolerated higher levels of disturbance than in *Diospyros*. It was more or less continuously distributed within all of the relatively small patches of *Albizia* vegetation. In ten visits to different *Albizia*-dominated patches, turacos were always contacted within a short period, unlike the situation observed in *Diospyros* habitat, where turacos were less frequently contacted and were usually restricted to patches separated by expanses of apparently similar *Diospyros* vegetation. Indeed, in Kiwengwa and Muyuni, the species occupied only a fraction of the much larger vegetation patches.

Changing forest cover and turaco range

According to the 1977–78 data, the area covered by tall trees was 115 km^2 (41 *Albizia*, 74 *Diospyros*). Fischer's Turaco's range in 2001 (Fig 2) was confined to those areas that were forested in 1977–78, with the exception of three tiny *Diospyros*-dominated patches (total area 8.7 km^2). These patches were probably missed by the 1977–78 aerial map or have recently re-grown. Seemingly, between 1977–78 and 2001 at least 25 km^2 were deforested in Zanzibar.

We estimated the total range of Fischer's Turaco in 2001 to be 56 km^2, of which 34 km^2 were *Diospyros*- and 22 km^2 *Albizia*-dominated. Of the total estimated range, a maximum of 25 km^2 presently enjoys some form of protection as a government-held reserve or as a sacred grove. Only a small part (16%) of Fischer's Turaco range fell under low human impact, while 42% fell under high impact and 42% under medium impact. All the patches with low, and 60% of those with



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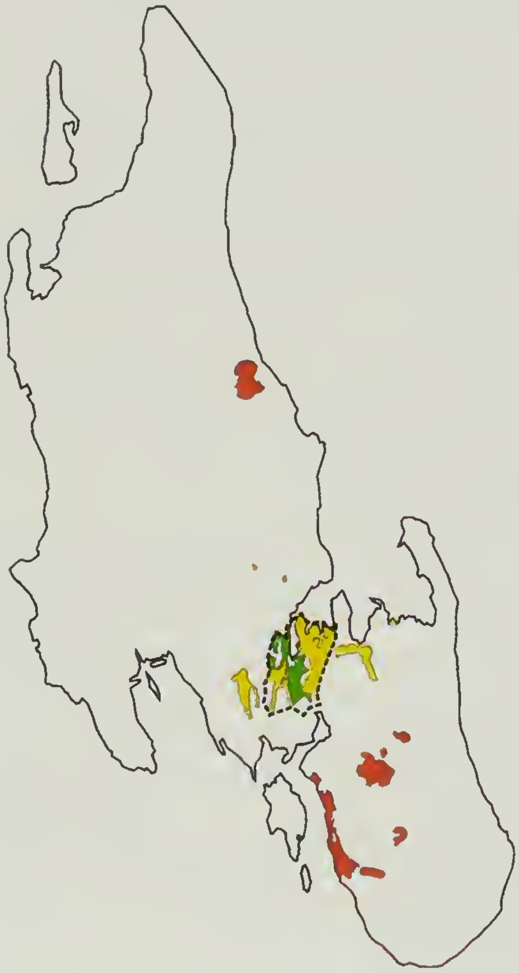

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medium, human impact were inside Jozani Forest Reserve (Fig 3). All woodland areas where Fischer's Turaco was not found were in the highest human-impact class.

The current distribution of the turaco is suggestive of a shrinking range, being a remnant of a formerly larger and continuous area that is currently fragmented. The apparent nucleus of the species' distribution is in the protected area of Jozani Forest.

Captions to figures on opposite page

Figure 1. A view of the groundwater forest at Jozani Forest Reserve (Andrea Borghesio)

La Forêt classée de Jozani (Andrea Borghesio)

Figure 2. Distribution of Fischer's Turaco *Tauraco fischeri* in Zanzibar (in green) based on our data.

Répartition du Touraco de Fischer *Tauraco fischeri* à Zanzibar (en vert) basée sur nos données.

Figure 3. Forest quality in Zanzibar. Green, yellow and red areas represent relatively low, medium, and high human-impact areas respectively. Most of the high-quality forests are inside Jozani Reserve (boundary indicated by a dashed line).

La qualité de la forêt à Zanzibar. Les zones vertes, jaunes et rouges représentent, respectivement, les zones à impact humain relativement bas, modéré, et élevé. La plupart des forêts de haute qualité se trouvent à l'intérieur de la Forêt classée de Jozani (dont les limites sont indiquées par une ligne interrompue)

Figure 4. Old secondary vegetation at Muungoni under heavy human exploitation; Fischer's Turaco *Tauraco fischeri* was present here (Luca Borghesio)

Vieille végétation secondaire à Muungoni sous forte exploitation humaine; le Touraco de Fischer *Tauraco fischeri* était présent ici (Andrea Borghesio)

Figure 5. An opening created following forest destruction at Cheju; food crops have been planted in the clearing (Luca Borghesio)

Une clairière créée suite à la destruction de la forêt à Cheju et plantée de cultures vivrières (Andrea Borghesio)

Population estimates of Fischer's Turaco

We estimated the population of Fischer's Turaco in Zanzibar to be 900–1,500 individuals, with a density slightly higher than one individual in 5 ha of suitable habitat. This is much higher than the previous estimate of fewer than 50 pairs[15], in part due to the wider range where we found the species. However, it is also probable that the species' secretive and shy behaviour led to a serious initial underestimate of its presence and abundance.

Population density was higher in *Albizia* than in *Diospyros*. However, *Diospyros*, owing to its larger area, was estimated to host a higher proportion (57%) of the total population. Only c44% (530 individuals) of the total population presently occurs in governmental or privately managed protected areas.

Co-occurrence of Fischer's Turaco with other vertebrates

Fischer's Turaco presence was positively correlated with that of Zanzibar Red Colobus, Black-and-rufous Elephant-shrew and Sykes's Monkey. However, it strongly avoided sites where Indian House Crow was present. Fischer's Turaco appeared less adaptable to habitat modifications than the two threatened vertebrates (Zanzibar Red Colobus and Black-and-rufous Elephant-shrew). As previously observed by Siex & Struhsaker[13], Zanzibar Red Colobus also tolerates cultivated landscapes.

Current conservation status of Fischer's Turaco

Compared to Beentje's[1] survey of 1989, our 2001 survey demonstrated that the status of forests in Zanzibar is rapidly deteriorating. This situation is attributable to the growing human population of the coral rag zone, which has immigrated from the deep soil zone. Indeed, during the last 30 years human population in Zanzibar has been growing at over 3% per annum, with a present total in excess of 500,000 individuals[6]. Although clearance for agriculture has been extensive, it appears that habitat degradation due to firewood and timber extraction has been considerably more widespread, and presently almost all wooded areas outside Jozani are intensely exploited (Figs 4–5). This pressure appears to increase as wooded areas progressively shrink.

At present exploitation levels, it appears probable that within c10 years no natural forest will remain outside the protected areas. Our survey shows that most (56%) of the estimated population of Fischer's Turaco in Zanzibar occurs outside protected areas. We therefore predict a population decline of over 50% for the turaco in the next decade, a pattern also highly probable for the other threatened species on the island. Such dramatic declines and the confinement of the residual populations in one or few areas could trigger an imminent extinction crisis in the island.

Fischer's Turaco is presently considered Near Threatened[2]. Although this study only focused on a small part of its range, our data suggest that a reassessment of its conservation status is necessary. Although human density in Zanzibar is higher than on the mainland, we feel that the high rates of habitat destruction noted in Zanzibar are probably not dramatically different from the situation elsewhere. Indeed, existing evidence points to rapid habitat degradation in most East African coastal forests[14,16]. We suggest that Fischer's Turaco be considered Vulnerable under IUCN criteria[9], as it appears to qualify under criterion A2c (population decline of at least 20% suspected to be met within the next ten years based on decline in area of occupancy, extent of occurrence and quality of habitat).

Conservation recommendations

As a considerable proportion of the populations of other endemic and threatened taxa occur outside Jozani reserve, it is imperative that the scope of future actions be widened to include larger areas beyond the reserve. The patches of forest in the southern part of the island are a priority.

Due to inefficient planning, fees that woodcutters are supposed to pay the government for felling trees are rarely collected. Benefits derived from clearing natural forests are therefore almost free of cost. Enforcement of existing legislation to ensure payment of such fees could make exploitation of natural forests economically less profitable.

At present, the main reason for woodland degradation appears to be firewood extraction. Large expanses of land in the coral rag zone (perhaps 50% of total area) are occupied by young secondary habitats that arise when cultivated fields are abandoned. As secondary vegetation is dominated by soft-wooded plants unsuitable for firewood, they have little economic value. It would be wise to develop an incentive system that encourages creation of tree plantations in such areas. Such plantations would provide alternative wood sources and reduce pressure on the remaining natural woodlands, improving the survival prospects of the threatened species that depend on them.

Zanzibar attracts large numbers of tourists. The main attraction for almost all tourists visiting the forests is the endemic red colobus, found in Jozani. We consider that Fischer's Turaco, being a species of considerable beauty and rarity, also has the potential for attracting interest from birdwatchers and generating revenue. Our finding that the species can easily be attracted with cheap audio devices suggests that the difficulty of observation could easily be overcome.

Fischer's Turaco has the characteristics of a flagship and an umbrella species: it is a charismatic species that could focus conservation awareness or action, and has sufficiently broad habitat requirements that, if adequately protected, most other threatened species on the island would also be protected.

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[a]*Department of Ornithology, National Museums of Kenya, PO Box 40658, Nairobi, Kenya.*

[b]*C. Re Umberto 42, I-10128 Torino, Italy.*

[c]*Zanzibar Land Animals Park, PO Box 811, Zanzibar, Tanzania.*

[d]*Department of Commercial Crops, Fruits & Forestry, PO Box 3526, Zanzibar, Tanzania.*

[e]*501 South Shirkshire Road, Cornway, MA 01341, USA.*

[f]*5757 Kirkwood Place, North Seattle, WA 98103, USA.*

[g]*Acoustics Department, IEN (Instituto Eletrotecnico Nazionale Galileo Ferraris), Strada delle Cacce 91, I-10135 Torino, Italy.*